Patent claims

1. A spray powder for the manufacture of a thermally insulating layer which remains resistant to high temperatures, a coating of the type TBC, which can be produced on a substrate by means of a thermal spraying process, wherein the substrate can already be coated with a single or multilayer part coating, in particular a primer and wherein at least one thermally insulating functional material is used, which on the one hand has a lower thermal conductivity than the substrate and on the other hand forms a chemically and thermally stable phase at high temperatures,
characterised in that the spray powder comprises particles (1) which respectively have an agglomerate-like microstructure (2) formed by a plurality of granules (3) adhering to each other, in that these granules are made of the functional material or the functional materials, in that at least one further component is present made of an additive (4) or a plurality of additives, in that this further component is distributed finely dispersed on the surfaces (30) of the functional material granules (3), i.e. mainly in their boundary zones (5) and that the further component in the given form or in a transformed form exerts a retarding or eliminating effect with regard to sintering compounds, which can form at high temperatures between the functional material granules.

2. A spray powder in accordance with claim 1, characterised in that, in relation to all the component (3, 4), which is formed from the additive (4) or the additives, has a proportion of not more than 5 mol %, preferably at the most 3 mol % in that the functional material

granules (3) have an average diameter d_{50} greater than 1nm and smaller than 10µm and that the particles (1) of the spray powder have an average diameter d_{50} in the range of 1µm to 100µm.

3. A spray powder in accordance with claim 1 or claim 2, characterised in that the additive (4) or the additives are deposited between the functional material granules (3) of the particle (1) in a phase comprising metal salts, wherein these salts can be transformed thermally into metal oxides, so that the additive only takes on the effective form, which influences the sintering compounds after a transformation of the salts by means of a thermal treatment step.

4. A spray powder in accordance with claim 1 or claim 2, characterised in that the agglomerates, which form the particles (1) contain, respectively communicating, pore spaces open against the outer surface (11) of the particle and that the additive (4) or the additives are deposited in these pore spaces and also on the outer surface.

5. A spray powder in accordance with one of the claims 1 to 4, characterised in that the functional material granules (3) comprise one or more of the following materials:
- zirconium oxide, in particular stabilised zirconium oxide YSZ;
- a ceramic material such as lanthanum zirconate , which has a pyrochloric structure $A_2B_2O_7$, wherein A and B are present in a cationic form A^{n+} and B^{m+}, respectively with value pairs n, m = 3, 4, or 2,5 applying to their charges n+ and m+, the formula for the pyrochloric structure generally being $A_{2-x}B_{2+x}O_{7-y}$ and the following chemical elements can be selected as A and B:

A = La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb or a mixture of these elements and B = Zr, Hf, Ti;
- a magneto plumbite phase $MMeAl_{11}O_{19}$,
with M = La, Nd and Me = Mg, Zn, Co, Mn, Fe, Ni, Cr;
while the additive (4) or the additives are, for example, Al-, Mg-, and/ or La-oxide, yttrium aluminium oxide or a spinel, in particular magnesium aluminium oxide.

6. A spray powder in accordance with one of the claims 1 to 5, characterised in that each additive (4) or the transformed form of this which can effectively influence the sintering process is not miscible with the functional material, so that diffusion into the functional material is extensively avoided.

7. A method for the manufacture of a spray powder in accordance with one of the claims 1 to 6, characterised in that
A1) at least one of the additives (4) is introduced into a porous agglomerate of the functional material granules (3) by means of an impregnating process or that
A2) agglomerates are manufactured from a mixture of the functional material granules and the finely dispersed additive or a homogenous or colloidal solution of the additive, wherein the agglomerates are preferably produced by the spray drying of a slurry and a subsequent calcining.

8. A method in accordance with claim 7, characterised in that, in a first step, the additives are added to the porous agglomerate in the form of a metal salt solution or are mixed with the functional mate-

rial granules (3), whereby these salts can be transformed thermally into metal oxides, in a second step the mixture is dried and in a third step the salts are transformed by means of a thermal treatment into a form which can influence the sintering process effectively.

9. A method in accordance with claim 7 or claim 8, characterised in that, in a concluding step, the agglomerate-like particles (1) are melted in a plasma flame for a short while.

10. A coated substrate with a thermally insulating layer, which is manufactured from a spray powder in accordance with one of the claims 1 to 9.